

A decorative border surrounds the text, featuring a repeating pattern of colorful balloons (blue, purple, orange, and pink) and green streamers with yellow and red accents.

Victoria Shanghai Academy

Year 6 (MYP 1)  
Mathematics  
Simple Algebra

Name: \_\_\_\_\_

Class: \_\_\_\_\_ ( )

## Algebra Expression (Centre 1)

Ex 1: Write an algebraic expression for each question.

**(Don't forget about the units!)**

1. Chris has \$ $y$ . If he spends on \$40, he has \_\_\_\_\_ left.
2. David has  $x$  mL of water. If he drinks 380 mL of water, he has \_\_\_\_\_ of water.
3. Hilton is  $c$  years old. 5 year later, he will be \_\_\_\_\_ years old.
4. Carol weights  $z$  kg. May weighs 43 kg. They weight \_\_\_\_\_altogether.
5. 4 children share  $x$  candy canes equally. Each child gets \_\_\_\_\_ candy canes.
6. There are 4 moon cakes in a box. There are \_\_\_\_\_ moon cakes in  $y$  box.
7. A dozen pens cost \$ $a$ . Each pen costs\_\_\_\_\_.

Ex 2: Transfer the following mathematical sentences into algebraic expression (Centre 1)

- |                                 |                                 |
|---------------------------------|---------------------------------|
| 1. Add $y$ to 15 = _____        | 6. Less than $p$ by 5 = _____   |
| 2. Multiply $k$ by 8 = _____    | 7. More than 13 by $g$ = _____  |
| 3. Subtract 12 from $x$ = _____ | 8. $c$ times 15 = _____         |
| 4. 6 times $a$ = _____          | 9. Subtract $s$ from 15 = _____ |
| 5. Divide $b$ by 4 = _____      | 10. Divide 9 by $r$ = _____     |

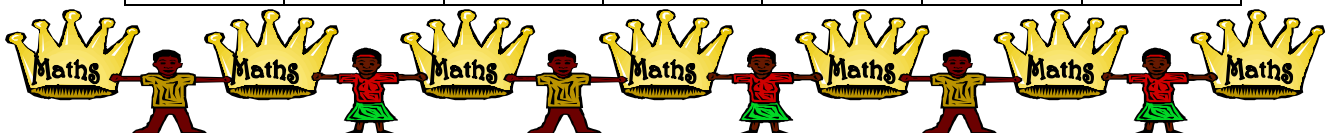
Ex 3: Write the correct number in each box. (Centre 2)

$y$	7	11	13	17	19	21
$y - 6$						

$A$	3	4	5	6	7	11
$7A$						

$B$	2	3	4	5	7	20
$\frac{B}{4}$						

$X$	2	4	6	8	10	12
$X + 5$						
$3X$						
$\frac{X}{10}$						



## Basic Algebra and Simple equation

### What are equations?

#### Instructions:

1. Read the definition of equation from different sources:
  - a. (Haese & Harris) Mathematics for the international student 6 MYP 1 (p.374)

## A WHAT ARE EQUATIONS?

An **equation** is a mathematical sentence which indicates that two expressions have the same value. An equation always contains an *equal* sign  $=$ .

A simple equation may be a true numerical statement like  $3 \times 5 = 7 + 8$ .

$\uparrow \quad \quad \uparrow \quad \quad \uparrow$   
**LHS equals RHS**

Notice that an equation has a **left hand side (LHS)** and a **right hand side (RHS)** and these are separated by the **equal sign**.

An **algebraic equation** like  $3x + 2 = 11$  has an **unknown** or **variable** in it, in this case  $x$ . To **solve** an equation is to find the value of the variable which makes the equation true.

If we were to replace  $x$  by a variety of numbers, most of them would make the equation false.

For example, if  $x = 1$  the LHS is  $3 \times 1 + 2 = 3 + 2 = 5$  but the RHS = 11

if  $x = 5$  the LHS is  $3 \times 5 + 2 = 15 + 2 = 17$  but the RHS = 11

However, if  $x = 3$  the LHS is  $3 \times 3 + 2 = 9 + 2 = 11$  and the RHS = 11.

So,  $x = 3$  makes the equation  $3x + 2 = 11$  true,

and we say  $x = 3$  is the **solution** of the equation  $3x + 2 = 11$ .

- b. Mathletics – dictionary
  - c. Any other sources – books or websites
2. Discuss with your group members and rewrite the definition of equation in your Mathematics Journal.
  3. What number can replace  $\square$  to make the equation true?
    - a.  $3 + \square = 10$
    - b.  $3 \times \square = 18$
    - c.  $20 \div \square = 4$
    - d.  $\square - 8 = 4$
  4. Is it an equation or an expression?
    - a.  $3 + \square$  (Expression)
    - b.  $X - 3 = 7$
    - c.  $2(y - 8)$
    - d.  $y - 5 = 8 - y$

**Challenge for fast workers:**

Work on (H&H: Ex 20A)

Finish the set task in your Math Journal, showing clear steps and check your own answers.

**EXERCISE 20A**

- 1 State whether each of the following is an equation or an expression:
  - a  $x - 3 = 7$
  - b  $2(x + 4)$
  - c  $3 \div 7 + x - 1$
  - d  $x - 2 = 7 - x$
  - e  $2(x - 1) = 3$
  - f  $3 - 2(1 + x)$
- 2 What number can be used to replace  $\square$  to make the equation true?
  - a  $5 + \square = 15$
  - b  $\square + 9 = 22$
  - c  $15 - \square = 2$
  - d  $\square - 9 = 10$
  - e  $5 \times \square = 30$
  - f  $\square \div 3 = 8$
  - g  $75 \div \square = 15$
  - h  $\square \times 4 = 22 + 2$
  - i  $\square \times 2 + 1 = 11$
- 3 For each of the following, suppose  $x$  is the number. Use the statement to write an equation involving  $x$ .
  - a Seven added to a number is equal to ten.
  - b Five subtracted from a number is equal to eleven.
  - c A number multiplied by four is equal to twelve.
  - d A number when divided by ten is equal to two.

# Basic Algebra and Simple equation

## Solving simple equations by inspection and trial and error

### Instructions:

(Answer all questions in your Mathematics Journal)

1. Read the given information on solving simple equations.

(Haese & Harris) Mathematics for the international student 6 MYP 1, p. 375-376)

## B

## SOLVING SIMPLE EQUATIONS

In this chapter we will be dealing with equations which have **one unknown**.

Remember that in algebra:

- the  $\times$  sign is omitted where possible.      For example,  $5 \times x$  is written  $5x$ .
- the  $\div$  sign is usually written as a fraction.      For example,  $x \div 3$  is written  $\frac{x}{3}$ .

In **Chapter 18** we saw that given an expression involving  $x$ , we can substitute a value for  $x$  to evaluate the expression.

For example, consider the expression  $4x - 3$ .

When  $x = 2$ ,  $4x - 3 = 4 \times 2 - 3 = 5$ .

In this chapter we are now presented with equations such as  $4x - 3 = 5$ . Our task is to work out that  $x$  must be 2.

$\therefore$  is read as *therefore*.  
We use it to show that the next line of work follows from the previous line.

### SOLVING BY INSPECTION

Some simple equations can be solved by **inspection**.

For example, for the equation  $x + 2 = 8$   
we notice that since  $6 + 2 = 8$ ,  $x$  must be 6.

We write:  $x + 2 = 8$

$$\therefore x = 6$$



#### Example 2

#### Self Tutor

Solve by inspection:

**a**  $a + 6 = 11$

**c**  $14 - x = 8$

**b**  $\frac{b}{3} = 8$

**d**  $7p = 49$

**a**  $a + 6 = 11$

$\therefore a = 5$  {as  $5 + 6 = 11$ }

**c**  $14 - x = 8$

$\therefore x = 6$  {as  $14 - 6 = 8$ }

**b**  $\frac{b}{3} = 8$

$\therefore b = 24$  {as  $24 \div 3 = 8$ }

**d**  $7p = 49$

$\therefore p = 7$  {as  $7 \times 7 = 49$ }

2. Read the given information on solving simple equations.  
(Haese & Harris) Mathematics for the international student 6 MYP 1, p.376)

## SOLVING BY TRIAL AND ERROR

Another method of solving simple equations is to use **trial and error**. This involves substituting different numbers in place of  $x$  until the correct solution is obtained.

For example, to solve  $4x - 13 = 23$  we substitute different values for  $x$  and summarise our trials in a table.

So,  $x = 9$  is the solution.

$x$	$4x - 13$	
1	-9	← much too small
5	7	← getting larger
8	19	← almost
9	23	✓

3. Discuss with your group members and list the important information you've learned from 1 and 2.
4. List the two methods you can use to solve simple equations.
5. Solve the following:

### 1 Solve *by inspection*:

- |                            |                            |                              |
|----------------------------|----------------------------|------------------------------|
| <b>a</b> $7 + a = 15$      | <b>b</b> $48 \div p = 6$   | <b>c</b> $18 = 25 - n$       |
| <b>d</b> $t \div 4 = 10$   | <b>e</b> $* - 14 = 38$     | <b>f</b> $3 \times d = 18$   |
| <b>g</b> $n + 7 = 14$      | <b>h</b> $8a = 200$        | <b>i</b> $b \div 7 = 9$      |
| <b>j</b> $t + 3 = 3$       | <b>k</b> $7 + m = 19$      | <b>l</b> $t + 9 = 4$         |
| <b>m</b> $x - 7 = -2$      | <b>n</b> $6 + \square = 9$ | <b>o</b> $y \times 2 = -6$   |
| <b>p</b> $x \times x = 0$  | <b>q</b> $3 - x = 7$       | <b>r</b> $5t = -15$          |
| <b>s</b> $3x = 60$         | <b>t</b> $4x = -12$        | <b>u</b> $7x = 91$           |
| <b>v</b> $\frac{6}{n} = 2$ | <b>w</b> $6 = \frac{x}{8}$ | <b>x</b> $\frac{55}{t} = 11$ |

### 3 Solve by *trial and error*.

- |                         |                        |                         |
|-------------------------|------------------------|-------------------------|
| <b>a</b> $3x + 11 = 32$ | <b>b</b> $4x - 7 = 33$ | <b>c</b> $5x - 22 = 23$ |
| <b>d</b> $4x + 11 = 21$ | <b>e</b> $8x = 10$     | <b>f</b> $2 - 5x = -18$ |



## Basic Algebra and Simple equation

### Solving simple equations by maintaining balance

#### Instructions:

(Answer all questions in your Mathematics Journal)

1. Read notes from (Haese & Harris) Mathematics for the international student 6 MYP 1, p. 377-379)

## C

## MAINTAINING BALANCE

The **balance** of an **equation** can be likened to the **balance** of a **set of scales**. Changing one side of the equation without doing the same thing to the other side will upset the balance.



### PERFORMING OPERATIONS ON EQUATIONS

The equal sign represents the balancing point of the equation. The left hand side must balance the right hand side.

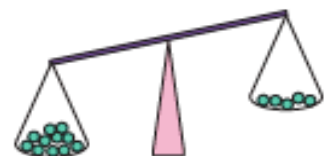
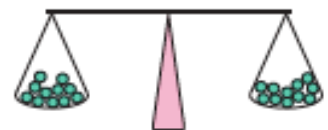
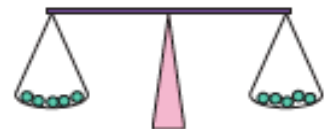
For example,  $5 = 5$

If 6 is added to both sides, the statement remains true:

$$5 + 6 = 5 + 6$$
$$\therefore 11 = 11$$

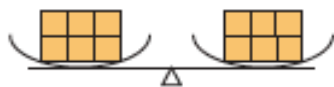
If 6 were added to one side only, then the statement would become false:

$$5 + 6 \neq 5$$
$$\therefore 11 \neq 5$$

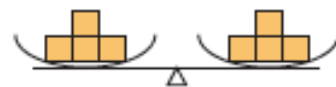


To maintain the balance, whatever is done on one side of the *equal* sign must also be done on the other side.

Imagine a set of scales with six identical blocks on each side. The scale is **balanced**.



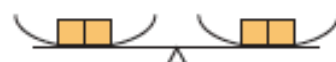
If we subtract 2 blocks from each side we get:



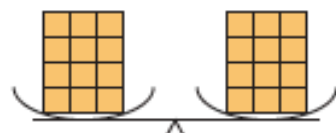
If we add 1 block to each side we get:



If we divide the number of blocks on each side by 3 we get:



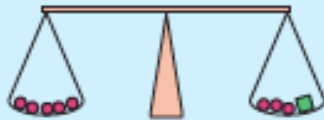
If we multiply the number of blocks on each side by 2 we get:



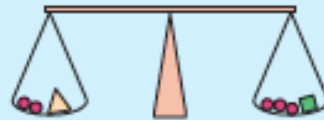
Notice that the scales are still balanced in each case!

**Example 3****Self Tutor**

If the bar is perfectly balanced, find the relationship or connection between the objects:

**a**

- a** By taking 3 ● from both sides  
we can see that  
1 ■ is equal to 2 ●

**b**

- b** By taking 2 ● from both sides  
we can see that  
1 △ is equal to 1 ● plus 1 ■  
So,  $\triangle = \bullet + \blacksquare$

**BALANCE**

The **balance** of an equation will be maintained if we:

- add the same amount to both sides
- subtract the same amount from both sides
- multiply both sides by the same amount
- divide both sides by the same amount.

**Example 4****Self Tutor**

Consider the equation  $x + 5 = 10$ . What equation results when we perform the following on both sides of the equation:

- a** add 3      **b** subtract 3      **c** divide by 2      **d** multiply by 4?

**a**  $x + 5 = 10$   
 $\therefore x + 5 + 3 = 10 + 3$   
 $\therefore x + 8 = 13$

**b**  $x + 5 = 10$   
 $\therefore x + 5 - 3 = 10 - 3$   
 $\therefore x + 2 = 7$

**c**  $x + 5 = 10$   
 $\therefore \frac{x + 5}{2} = \frac{10}{2}$   
 $\therefore \frac{x + 5}{2} = 5$

**d**  $x + 5 = 10$   
 $\therefore 4(x + 5) = 4 \times 10$   
 $\therefore 4(x + 5) = 40$

2. Discuss with your group members and list the important information you've learned from the above information.

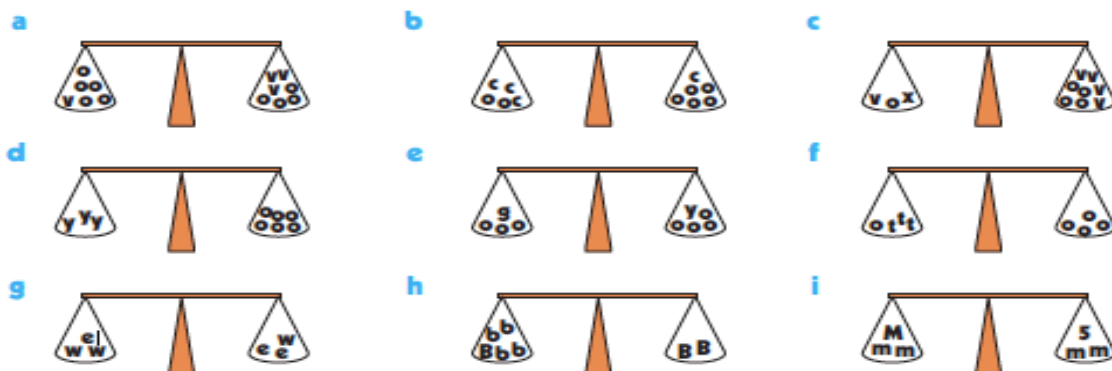


## Challenge for fast workers:

Finish H&H: Ex 20C.1 / Ex 20C.2 and check your own answers.

### EXERCISE 20C.1

- 1 These scales are perfectly balanced. Find the relationship between the objects.



- 2 The set of scales is balanced with two bananas and three strawberries on one side and 11 strawberries on the other.



- If three strawberries are taken from the left side, what must be done to the right side to keep the scales balanced?
  - There are now two bananas on the left hand side. How many strawberries balance their weight?
  - How heavy is one banana in terms of strawberries?
- 3 The set of scales is balanced with two golf balls and six marbles on the left and one golf ball and nine marbles on the right.
- If 6 marbles are taken from the left side, what must be done to the right side to keep the scales balanced?
  - If the golf ball on the right side is removed, what must be done to the left side to keep the scales balanced?
  - Redraw the scales if both **a** and **b** occur.
  - How heavy is one golf ball in terms of marbles?



### EXERCISE 20C.2

- 1 Find the equation which results from *adding*:

- 3 to both sides of  $x = 4$
- 5 to both sides of  $x + 7 = 5$
- 5 to both sides of  $x - 5 = 8$
- 7 to both sides of  $2x - 7 = 3$

- 2 Find the equation which results from *subtracting*:

- 2 from both sides of  $x = 8$
- 5 from both sides of  $x + 5 = -2$
- 5 from both sides of  $5 - x = 9$
- 6 from both sides of  $3x + 6 = -1$

- 3 Find the equation which results from *multiplying* both sides of:

- $x = 6$  by 2
- $2x = 1$  by 3
- $\frac{x}{2} = 5$  by 2
- $x + 1 = 9$  by 7
- $\frac{x+1}{2} = -1$  by 2
- $\frac{1-x}{3} = 4$  by 3

- 4 Find the equation which results from *dividing* both sides of:

- $2x = 6$  by 2
- $3(x + 2) = 6$  by 3
- $2x + 6 = 0$  by 2
- $3x + 9 = 15$  by 3
- $3x = 14$  by 3
- $6(x - 1) = 18$  by 6
- $4x - 16 = -4$  by 4
- $8(x + 2) = 24$  by 8

## Basic Algebra and Simple equation

### Solving simple equations by inverse operation

#### Instructions:

(Answer all questions in your Mathematics Journal)

1. Read notes from (Haese & Harris) Mathematics for the international student 6 MYP 1, p. 380)

D

## INVERSE OPERATIONS

Imagine starting with \$50 in your pocket. You find \$10 and then pay someone \$10. You still have \$50.

This can be illustrated by a **flowchart** such as



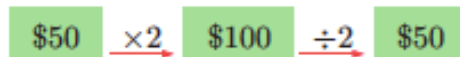
Observe that adding 10 and subtracting 10 have the opposite effect. One undoes the other.

We say that

addition and subtraction are **inverse operations**.

Now imagine you start with \$50, and your friend gives you the same amount. Your money is now doubled. If you decide to give half to your brother, you will be back to your original \$50.

We again illustrate the process by a flowchart:



Observe that multiplying by 2 and dividing by 2 undo each other.

We say that

multiplication and division are **inverse operations**.

We can solve simple equations using *inverse operations*, but we must remember to keep the equation *balanced* by performing the same operation on *both sides* of the equation.

For example,

consider  $x + 3 = 7$

where 3 has been added to  $x$ .

$$\therefore x + 3 - 3 = 7 - 3$$

{subtracting 3 is the inverse of adding 3}

$$\therefore x = 4$$

{simplifying}

2. Discuss with your group members and list the important information you've learned from 1 and 2.

3. State the inverse of the following:

- a.  $\times 6$  (answer:  $\div 6$ )
- b.  $- 10$
- c.  $+ 5$
- d.  $\div \frac{2}{3}$

4. Simplify the following expressions

- a.  $m \times 7 \div 7 = ( m )$
- b.  $x - 25 + 25 = ( \quad )$
- c.  $u + 8 - 8 = ( \quad )$
- d.  $m \div \frac{3}{4} \times \frac{4}{3} = ( \quad )$

5. Find the unknown using the inverse operation: (Show the steps clearly)

a.  $y + 7 = 10$

b.  $5t = 20$

**Challenge for fast workers:**

Work on (H&H: Ex 20D).

Finish the set task in your Math Journal, showing clear steps and check your own answers.

**EXERCISE 20D**

1 State the inverse of each of the following operations:

a  $\times 3$

b  $+5$

c  $-4$

d  $\div 7$

e  $-\frac{3}{4}$

f  $\times \frac{2}{3}$

g  $+10$

h  $\div \frac{1}{3}$

2 Simplify the following expressions:

a  $x + 7 - 7$

b  $x - 3 + 3$

c  $x \div 2 \times 2$

d  $3x \div 3$

e  $\frac{x}{5} \times 5$

f  $\frac{2x}{2}$

g  $\frac{2x}{3} \div \frac{2}{3}$

h  $\frac{2x}{5} \times 5$

3 Find  $x$  using an inverse operation:

a  $x + 7 = 10$

b  $x + 15 = 6$

c  $x + 3 = 0$

d  $x + 11 = -4$

e  $7 + x = 9$

f  $8 + x = 14$

4 Find  $y$  using an inverse operation:

a  $y - 7 = 4$

b  $y - 2 = 0$

c  $y - 6 = -1$

d  $y - 11 = 32$

e  $y - 8 = -8$

f  $y - 15 = -32$

5 Find  $t$  using an inverse operation:

a  $4t = 8$

b  $6t = 30$

c  $2t = 4$

d  $3t = 15$

e  $5t = 20$

f  $3t = -9$

g  $7t = -56$

h  $7t = 56$

i  $8t = -56$

Notice the  
'balancing'!



**6** Find  $d$  using an inverse operation:

**a**  $\frac{d}{2} = 3$

**b**  $\frac{d}{4} = 7$

**c**  $\frac{d}{2} = 8$

**d**  $\frac{d}{5} = 6$

**e**  $\frac{d}{3} = -4$

**f**  $\frac{d}{7} = -1$

**7** Find the unknown using a suitable inverse operation:

**a**  $x + 7 = 0$

**b**  $x - 5 = 6$

**c**  $d + 9 = -1$

**d**  $p - 6 = 8$

**e**  $3g = 15$

**f**  $\frac{x}{4} = 8$

**g**  $7m = 28$

**h**  $\frac{y}{2} = 4$

**i**  $k + 6 = -2$

**j**  $11s = -44$

**k**  $t - 4 = 0$

**l**  $4t = -36$

**m**  $p - 15 = 23$

**n**  $y + 11 = 7$

**o**  $\frac{k}{7} = -2$

**p**  $9n = -72$

**q**  $\frac{e}{13} = 1$

**r**  $n + 13 = 4$

**s**  $\frac{d}{-6} = 12$

**t**  $w - 19 = -6$

**u**  $\frac{y}{-7} = -7$

## REVIEW SET 18A

1 Write in algebraic form:

**a**  $x \times 2 \times y$

**b**  $M = 3 \times n + d$

**c**  $b \times a + c \times 3$

**d**  $n \div 3$

**e**  $(a + b) \div c$

**f**  $100 \div (x - 3)$

2 Write in algebraic form:

**a** the product of  $c$  and 2

**b** treble the sum of  $a$  and 6

**c** 5 more than  $t$

**d**  $d$  less than  $n$

3 Toothpaste costs  $\mathcal{L}x$  a tube. What will be the total cost of  $y$  tubes?

4 Theatre tickets cost  $\$x$  per adult,  $\$y$  per senior, and  $\$z$  per child. What will be the total cost for 2 adults, 1 senior, and 5 children?

5 If  $y = 39 - 4x$ , find  $y$  when: **a**  $x = 2$       **b**  $x = 7$ .

6 The following pattern is built out of matchsticks:  $\square$ ,  $\square\square$ ,  $\square\square\square$ , .....

**a** Draw the next 2 figures in the pattern.

**b** Copy and complete:

Figure number ( $n$ )	1	2	3	4	5
Matchsticks needed ( $M$ )					

**c** Find the rule connecting  $M$  and  $n$ .

**d** How many matchsticks are needed to build:

**i** 7 squares

**ii** 101 squares?

7 TLC Carpet Cleaning Company charges a \$20 callout fee and then \$15 for each room it cleans. Copy and complete the table of values for the charge  $C$  dollars for cleaning  $n$  rooms:

$n$	0	1	2	3	4	5
$C$						

**a** What is TLC's fee formula?

**b** Find how much TLC would charge for cleaning a mansion with 27 rooms.

**c** Draw a line graph of  $C$  against  $n$  with  $n$  on the horizontal axis and  $n = 0, 1, 2, 3, \dots, 10$ .



## REVIEW SET 20A

- 1 A number multiplied by three is equal to eighteen. Find the number.
- 2
  - a Is  $2x + 5y = 7$  an equation or an expression?
  - b State the inverse of  $\times 6$ .
  - c Find the result of adding 8 to both sides of  $3x - 8 = 5$ .
  - d Solve  $2x = -4$  by inspection.
- 3 One of the numbers  $\{1, 2, 5, 8\}$  is the solution to the equation  $3x + 7 = 22$ . Find the solution by trial and error.
- 4 The following scales are perfectly balanced. Find the relationship between the objects:

a



b



- 5 Find  $x$  using an inverse operation:

a  $5 + x = 11$

b  $x - 8 = -2$

c  $4x = -32$

d  $\frac{x}{3} = -1$

- 6 Copy and complete the following flowcharts:



- 7 Use a flowchart to show how the following expressions are built up from  $x$ :

a  $\frac{x + 4}{6}$

b  $4x - 5$

- 8 Use a flowchart to show how to isolate  $x$  in the following expressions:

a  $\frac{x}{5} + 8$

b  $3(x - 9)$

- 9 Solve for  $x$ :

a  $4x + 5 = 12$

b  $\frac{x}{3} = -4$

c  $\frac{x}{3} - 5 = 7$

d  $11x - 6 = 2$

e  $4(x - 2) = 20$

f  $6(x + 3) = 54$

- 10 Anneke has €13. She is promised the same amount for washing the dishes each night. After seven nights of dishwashing she has €55. How much was she paid each night?



### ***Supplementary Exercise***

***Ex4A: (Longman Primary Mathematics 6C p.25)***

***Show workings in your Mathematics Journal.***

***Don't forget to check the answer***

- |                   |                    |
|-------------------|--------------------|
| 1. $3x + 8 = 26$  | 6. $6y - 12 = 6$   |
| 2. $5y + 7 = 52$  | 7. $14x - 32 = 10$ |
| 3. $8z + 10 = 34$ | 8. $9z - 40 = 23$  |
| 4. $7w + 5 = 5$   | 9. $12d - 18 = 30$ |
| 5. $4k + 6 = 18$  | 10. $10w - 50 = 0$ |

***Ex4B: (Longman Primary Mathematics 6C p.27)***

***Show workings in your Mathematics Journal.***

***Don't forget to check the answer***

- 6 times a number minus 15 equals 33. Find the number.
- 3 times a number plus 8 equals 23. Find the number.
- Multiply a number by 9 and then add 26. The result is 44. Find the number.
- Multiply a number by 7 and then subtract 13. The result is 36. Find the number.
- Mum bought 3 bottles of orange juice with the same capacity. She used 1200 mL of the orange juice to make some fruit punch. She now has 300 mL left. How many millilitres of orange juice did each bottle contain?
- Dad spent \$644 on 4 adult tickets and 1 child ticket for a circus show. Each child ticket cost \$84. How much did each adult ticket cost?
- Uncle John spent \$37 on 1 ice cream cone which cost \$5 and 8 ice lollies. How much did each ice lolly cost?
- A tin of mixed fruit costs \$6. The cost of 7 tins of ham is \$50 more than a tin of mixed fruit. How much does each tin of ham cost?
- Mum is 38 years old. Her age is 2 years less than 5 times her son's age. How old is her son?
- Kate bought 2 sets of bookmarks. The number of bookmarks was the same in each set. She gave 4 of the bookmarks to her friend and 16 bookmarks are left. How many bookmarks were there in each set originally?
- Tom spent \$16 on some pencils and a pen. The prices of the pencil and the pen were both \$4 each. How many pencils did Tom buy?

**Ex5A: (Longman Primary Mathematics 6C p.30)**  
**Show workings in your Mathematics Journal.**  
**Don't forget to check the answer**

1.  $\frac{e}{5} + 8 = 73$

4.  $\frac{w}{10} - 12 = 8$

2.  $\frac{y}{8} - 5 = 6$

5.  $\frac{y}{9} + 23 = 23$

3.  $\frac{u}{7} + 4 = 18$

6.  $\frac{m}{6} - 9 = 0$

**Ex5B: (Longman Primary Mathematics 6C p.32)**

Write and solve the simple equation. Then check the answer.

1. Kevin poured a bottle of soft drink into 5 glasses equally. Then he drank 100 mL of the soft drink from one of the glasses. He has 150 mL left in that glass. How many millilitres of soft drink did the bottle contain?
2. Pupils A, B, C and D share a packet of biscuits equally. If pupil A gives 5 biscuits to pupil B, pupil B has 17 biscuits. How many biscuits are there in the packet?
3. Mum divided a bag of plums into 6 groups equally. Kate ate 8 plums from one of the groups. 5 plums are left in that group. How many plums were there in the bag?
4. Peter divided a box of mangoes into 3 groups equally. The children ate 6 mangoes from one of the groups. 3 mangoes are left in that group. How many mangoes were there in the box?
5. 8 monkeys shared a basket of bananas equally. Monkey B gave 3 bananas to Monkey A. Monkey A then ate all the 15 bananas altogether. How many bananas were there in the basket?

# Answer Keys for H&H Exercise

## REVIEW SET 18A

1 a  $2xy$  b  $M = 3n + d$  c  $ab + 3c$  d  $\frac{n}{3}$  e  $\frac{a+b}{c}$   
f  $\frac{100}{x-3}$

2 a  $2c$  b  $3(a+6)$  c  $t+5$  d  $n-d$  3  $\mathcal{L}(xy)$

4  $(2x+y+5z)$  dollars 5 a  $y=31$  b  $y=11$

6 a 

--	--	--	--	--

, 

--	--	--	--	--

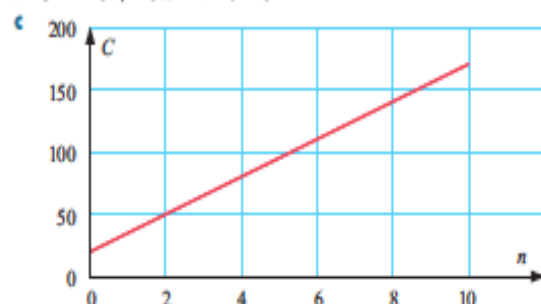
Figure number ( $n$ )	1	2	3	4	5
Matchsticks needed ( $M$ )	4	7	10	13	16

c  $M = 3n + 1$  d i 22 ii 304

7

$n$	0	1	2	3	4	5
$C$	20	35	50	65	80	95

a  $C = 20 + 15n$  b \$425



## EXERCISE 20A

1 a equation b expression c expression  
d equation e equation f expression

2 a  $\square = 10$  b  $\square = 13$  c  $\square = 13$  d  $\square = 19$   
e  $\square = 6$  f  $\square = 24$  g  $\square = 5$  h  $\square = 6$   
i  $\square = 5$

3 a  $x+7=10$  b  $x-5=11$  c  $4x=12$  d  $\frac{x}{10}=2$

## EXERCISE 20B

1 a  $a=8$  b  $p=8$  c  $n=7$  d  $t=40$   
e  $s=52$  f  $d=6$  g  $n=7$  h  $a=25$   
i  $b=63$  j  $t=0$  k  $m=12$  l  $t=-5$   
m  $x=5$  n  $\square=3$  o  $y=-3$  p  $x=0$   
q  $x=-4$  r  $t=-3$  s  $x=20$  t  $x=-3$   
u  $x=13$  v  $n=3$  w  $x=48$  x  $t=5$

2 a  $x=5$  b  $x=4\frac{1}{2}$  c  $x=7$  d  $x=6$   
e  $x=-1$  f  $x=-2$

3 a  $x=7$  b  $x=10$  c  $x=9$  d  $x=2\frac{1}{2}$   
e  $x=1\frac{1}{4}$  f  $x=4$

## EXERCISE 20C.1

1 a  $O=2V$  b  $2C=3O$  c  $X=3V+3O$   
d  $y=2O$  e  $g=y+O$  f  $t=O$   
g  $e=w$  h  $B=4b$  i  $M=5$

2 a take three strawberries b 8 strawberries  
c 4 strawberries

3 a take 6 marbles b remove 1 golf ball  
c d 3 marbles



## EXERCISE 20C.2

1 a  $x+3=7$  b  $x+12=10$  c  $x=13$  d  $2x=10$

2 a  $x-2=6$  b  $x=-7$  c  $-x=4$  d  $3x=-7$

3 a  $2x=12$  b  $6x=3$  c  $x=10$   
d  $7(x+1)=63$  e  $x+1=-2$  f  $1-x=12$

4 a  $x=3$  b  $x+2=2$  c  $x+3=0$   
d  $x+3=5$  e  $x=\frac{14}{3}$  f  $x-1=3$   
g  $x-4=-1$  h  $x+2=3$

## EXERCISE 20D

1 a  $\div 3$  b  $-5$  c  $+4$  d  $\times 7$  e  $+\frac{3}{4}$  f  $\div \frac{2}{3}$   
g  $-10$  h  $\times \frac{1}{3}$

2 a  $x$  b  $x$  c  $x$  d  $x$  e  $x$  f  $x$  g  $x$  h  $2x$

3 a  $x=3$  b  $x=-9$  c  $x=-3$  d  $x=-15$   
e  $x=2$  f  $x=6$

4 a  $y=11$  b  $y=2$  c  $y=5$  d  $y=43$   
e  $y=0$  f  $y=-17$

5 a  $t=2$  b  $t=5$  c  $t=2$  d  $t=5$   
e  $t=4$  f  $t=-3$  g  $t=-8$  h  $t=8$   
i  $t=-7$

6 a  $d=6$  b  $d=28$  c  $d=16$  d  $d=30$   
e  $d=-12$  f  $d=-7$

7 a  $x=-7$  b  $x=11$  c  $d=-10$  d  $p=14$   
e  $g=5$  f  $x=32$  g  $m=4$  h  $y=8$   
i  $k=-8$  j  $s=-4$  k  $t=4$  l  $t=-9$   
m  $p=38$  n  $y=-4$  o  $k=-14$  p  $n=-8$   
q  $e=13$  r  $n=-9$  s  $d=-72$  t  $w=13$   
u  $y=49$

# REVIEW SET 20A

1 6 2 a equation b  $\div 6$  c  $3x = 5$  d  $x = -2$

3  $x = 5$  4 a  $2+ = 3$  b  $2t = a + v$

5 a  $x = 6$  b  $x = 6$  c  $x = -8$  d  $x = -3$

6 a  $\boxed{x} \xrightarrow{\times 3} \boxed{3x} \xrightarrow{+8} \boxed{3x+8}$

b  $\boxed{x} \xrightarrow{-3} \boxed{x-3} \xrightarrow{\div 4} \boxed{\frac{x-3}{4}}$

7 a  $\boxed{x} \xrightarrow{+4} \boxed{x+4} \xrightarrow{\div 6} \boxed{\frac{x+4}{6}}$

b  $\boxed{x} \xrightarrow{\times 4} \boxed{4x} \xrightarrow{-5} \boxed{4x-5}$

8 a  $\boxed{\frac{x}{5} + 8} \xrightarrow{-8} \boxed{\frac{x}{5}} \xrightarrow{\times 5} \boxed{x}$

b  $\boxed{3(x-9)} \xrightarrow{\div 3} \boxed{x-9} \xrightarrow{+9} \boxed{x}$

9 a  $x = \frac{7}{4}$  b  $x = -12$  c  $x = 36$  d  $x = \frac{8}{11}$

e  $x = 7$  f  $x = 6$

10 €6

# REVIEW SET 20B

1 a  $\square = 45$  b  $\square = 4$

2 a  $a = 42$  b  $3x = 17$  c multiplying by 7 d  $x = -24$

3  $x = 3$  4  $3 - x = 10$  5 a  $+5$  b  $\div \frac{1}{2}$  c  $\times 6$

6 a  $t = -4$  b  $t = 6$  c  $t = 5$  d  $t = -24$

7 a  $\boxed{x} \xrightarrow{\div 4} \boxed{\frac{x}{4}} \xrightarrow{-7} \boxed{\frac{x}{4} - 7}$

b  $\boxed{x} \xrightarrow{+6} \boxed{x+6} \xrightarrow{\times 5} \boxed{5(x+6)}$

8 a  $\boxed{x} \xrightarrow{\times 3} \boxed{3x} \xrightarrow{-7} \boxed{3x-7} \xrightarrow{\times 2} \boxed{2(3x-7)}$

b  $\boxed{x} \xrightarrow{\times 2} \boxed{2x} \xrightarrow{+3} \boxed{2x+3} \xrightarrow{\div 6} \boxed{\frac{2x+3}{6}}$

9 a  $\boxed{\frac{5x-3}{4}} \xrightarrow{\times 4} \boxed{5x-3} \xrightarrow{+3} \boxed{5x} \xrightarrow{\div 5} \boxed{x}$

b  $\boxed{6(2x+1)} \xrightarrow{\div 6} \boxed{2x+1} \xrightarrow{-1} \boxed{2x} \xrightarrow{\div 2} \boxed{x}$

10 a  $x = 9$  b  $x = \frac{3}{2}$  c  $x = 39$  d  $x = -10$

e  $x = 3$  f  $x = 21$

11 19 truffles

## Answer Keys for Longman Exercise

### Ex4A: (Longman Primary Mathematics 6C p.25)

1.  $3x + 8 = 26$  ( $x=6$ )
2.  $5y + 7 = 52$  ( $y=9$ )
3.  $8z + 10 = 34$  ( $z=3$ )
4.  $7w + 5 = 5$  ( $w=0$ )
5.  $4k + 6 = 18$  ( $k=3$ )
6.  $6y - 12 = 6$  ( $y=3$ )
7.  $14x - 32 = 10$  ( $x=3$ )
8.  $9z - 40 = 23$  ( $z=7$ )
9.  $12d - 18 = 30$  ( $d=4$ )
10.  $10w - 50 = 0$  ( $w=5$ )

Example of proper workings:

$$\begin{aligned}1. \quad & 3x + 8 = 26 \\ & 3x + 8 - 8 = 26 - 8 \\ & 3x = 18 \\ & 3x \div 3 = 18 \div 3 \\ & x = 6\end{aligned}$$

Checking:

$$\begin{aligned}\text{L.H.S.} &= 3x + 8 \quad (\text{when } x = 6) \\ &= 3 \times 6 + 8 \\ &= 18 + 8 \\ &= 26 \\ &= \text{R.H.S.}\end{aligned}$$

### Ex4A: (Longman Primary Mathematics 6C p.27)

1. 6 times a number minus 15 equals 33. Find the number.

(Answer for number 1 shows the proper full steps, remember to line up your equal sign.)

$$\begin{aligned}& \text{Let } x \text{ be the number} \\ & 6x - 15 = 33 \\ & 6x - 15 + 15 = 33 + 15 \\ & 6x = 48 \\ & 6x \div 6 = 48 \div 6 \\ & x = 8 \\ & \text{The number is 8.}\end{aligned}$$

Checking: If the number is 8,  
6 times of the number is 48,  
after minus 15 by 48 it equals 33.  
Therefore the number is 8.

2. (Let  $y$  be the number;  $3y+8=23$ ;  $y=5$ ; The number is 5.)
3. (Let  $x$  be the number;  $9x+26=44$ ;  $x=2$ ; The number is 2.)
4. (Let  $z$  be the number;  $7z-13=36$ ;  $z=7$ ; The number is 7.)
5. (Let  $b$  mL be the amount of orange juice each bottle contained;  
 $3b - 1200=300$ ;  $b=500$ ; Each bottle contained 500 mL of orange juice.)
6. (Let  $\$c$  be the price of each adult ticket.  $4c+84=644$ ;  $c=140$ ; Each adult ticket costs \$140.)
7. (Let  $\$x$  be the price of each ice lolly.  $8x+5=37$ ;  $x=4$ ; Each lolly costs \$4.)
8. (Let  $\$y$  be the price of each tin of ham.  $7y - 6 = 50$ ;  $y=8$ ; Each tin of ham costs \$8.)
9. (Let  $w$  years old be the age of her son.  $5w - 2 = 38$ ;  $w=8$ ; Her son is 8 years old.)
10. (Let  $x$  be the number of bookmarks in each set originally.  
 $2x - 4 = 16$ ;  $x=10$ ; There were 10 bookmarks in each set originally.)
11. (Let  $\$w$  be the number of pencils tom bought.  $4w + 4 = 16$ ;  $w=3$ ; Tom bought 3 pencils.)

## Answer Keys for Longman Exercise

### Ex5A: (Longman Primary Mathematics 6C p.30)

1.  $\frac{e}{5} + 8 = 73$  (e=325)

4.  $\frac{w}{10} - 12 = 8$  (w=200)

2.  $\frac{y}{8} - 5 = 6$  (y=88)

5.  $\frac{y}{9} + 23 = 23$  (y=0)

3.  $\frac{u}{7} + 4 = 18$  (u=98)

6.  $\frac{m}{6} - 9 = 0$  (m=54)

1.  $\frac{e}{5} + 8 = 73$   
 $\frac{e}{5} + 8 - 8 = 73 - 8$   
 $\frac{e}{5} = 65$   
 $\frac{e}{5} \times 5 = 65 \times 5$   
 $e = 325$

### Ex5B: (Longman Primary Mathematics 6C p.32)

1. Kevin poured a bottle of soft drink into 5 glasses equally. Then he drank 100 mL of the soft drink from one of the glasses. He has 150 mL left in that glass. How many millilitres of soft drink did the bottle contain?

Let c mL be the amount of soft drink the bottle contained.

$$\begin{aligned}\frac{c}{5} - 100 &= 150 \\ \frac{c}{5} - 100 + 100 &= 150 + 100 \\ \frac{c}{5} \times 5 &= 250 \times 5 \\ c &= 1250\end{aligned}$$

The bottle contained 1250 mL of soft drink.

Checking:

If the bottle contain 1250 mL of soft drink, when poured equally into 5 glasses, each glass contain 250 mL of soft drink. After drinking 100 mL from 250 mL, 150 mL of soft drink will be left in that glass. Therefore, the bottle contained 1250 mL of soft drink.

2. (Let y be the number of biscuits in the packet.  $\frac{y}{4} + 5 = 17$ , y=48, There are 48 biscuits in the packet.)
3. (Let w be the number of plums in the bag.  $\frac{w}{6} - 8 = 5$ , w=78, There were 78 plums in the bag.)
4. (Let k be the number of mangoes in the box.  $\frac{k}{63} - 6 = 3$ , k=27, There were 27 mangoes in the box.)
5. (Let b be the number of bananas in the basket.  $\frac{b}{8} + 3 = 15$ , b=96, There were 96 bananas in the basket.)